MURANG'A UNIVERSITY COLLEGE

(A Constituent College of Jomo Kenyatta University of Agriculture and Technology)

DEPARTMENT: **ELECTRICAL AND ELECTRONIC ENGINEERING**

DIPLOMA IN ELECTRICAL AND ELECTRONIC ENGINEERING

MAIN EXAMINATION

CLASS:	**MRUC/EEP/14DM**
LEVEL:	**DIPLOMA**
SEMESTER:	**1**
ACADEMIC YEAR:	**2014/15**
YEAR OF STUDY:	**2**
UNIT:	**ANALOGUE ELECTRONICS II**
UNIT CODE:	**SEE1202**

DATE: 24TH APRIL 2013 **TIME: 2 HOURS**

Instructions to candidates

This paper contains four **4** Questions

Attempt question **one (1)** and any **other two (2)** questions

You should have the following for this examination;

- Drawing instruments
- Scientific calculator

➢ **NO MOBILE PHONES ARE ALLOWED WITHIN THE EXAMINATION ROOM!!!!!!!**

Question 1 (30 marks)

a). Explain why it is desirable to mid-point bias class A amplifier [**2mks]**

b). State the primary disadvantage of using an amplifier with swamping resistor [**3mks]**

c). Explain the cause of crossover distortion in a class B transistor amplifier [**2mks]**

d). Show that the maximum theoretical efficiency for a class A amplifier is 25%. [**4mks]**

e). Explain what determine the class of operation of an amplifier. [**2mks]**

f). Explain why is class C operation more efficient than class A operation in transistor amplifier circuits. [**2mks]**

g). List the two operating states of the class D amplifier? [**2mks]**

h). State the purpose of amplifier coupling network? [**2mks]**

i). With the aid of diagrams, explain the operation of a turned class C amplifier [**6mks]**

j). List four characteristics of an ideal operational amplifier. [**3mks]**

k). Name the type of current that flows through n-channel JFET? [**1mrks]**

Question 2 (20 marks)

a). State the bias conditions that must exist for a transistor to operate as an amplifier **[2mks]**

b). Determine the following DC values for the amplifier in figure 1

V_B, V_E, I_E, I_C, V_C, and V_{CE} [**6mks]**

c). Determine the following AC values for the amplifier in figure 1

$R_{in(base)}$, R_{in}, A_v, A_i, A_p [**10mks]**

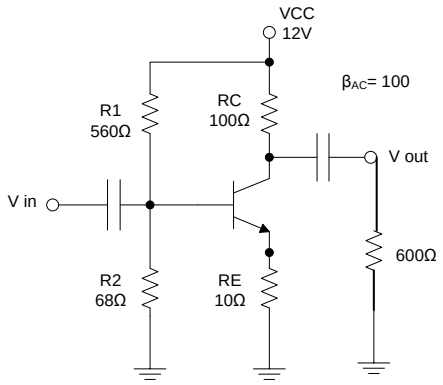

Figure 1

d). plot the AC load line **[2mks]**

Question 3 (20 marks)

a). Name two factors that determine the voltage gain of a CE amplifier **[2mks]**

b). State two operating states of the class D amplifier? **[2mks]**

c). A certain FET common source (CS) amplifier has gm of 2600μS, $R_L$of 22kΩ and R_D of 12kΩ. v_{gs}=v_{in}=40mV. Determine the voltage gain and v_{out} for both load and unloaded amplifier. **[8mks]**

d). Describe how changes in V_{GS} are related to changes in I_D for a n-channel JFET amplifier **[2mks]**

e). In the circuit figure 2, let R_1=5kΩ, R_f=20kΩ and v_i=1V. A load resistor of 5kΩ is connected at the output. Calculate **[6mks]**

i) Output voltage, V_o
ii) Closed loop gain, A_{CL}
iii) The load current,i_L

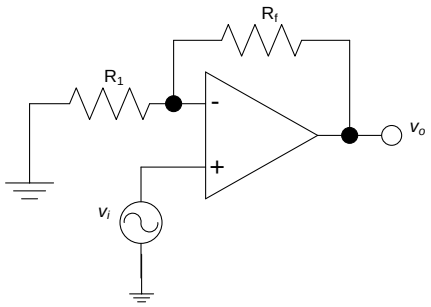

Figure 2

Question 4 (20mrks)

a). Explain why class C amplifiers unsuitable for voice and music amplification? **3mks**

b). List three advantages of class C amplifiers **3mks**

c). For the circuit of figure 3, determine bandwidth (BW),$i_{c(sat)}$, power dissipated by the transistor $P_D$if $v_{ce(sat)}$=0.2V, Maximum power load P_L, tank circuit power P_{tank}, maximum source power P_{DC}, and the efficiency. **14mks**

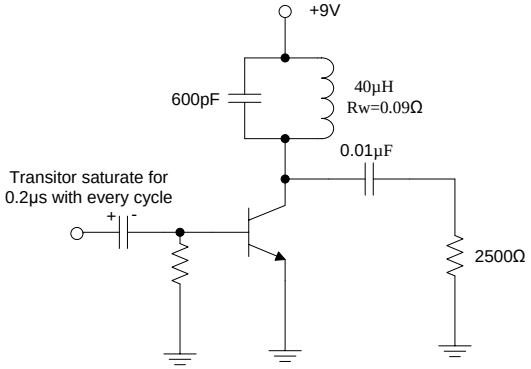

Figure 3